

# Grading Chronic Angina Pectoris (Myocardial Ischemia)

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Once it is determined that the patient's symptoms are thought to be due to chronic stable myocardial ischemia, the symptoms are then graded as 1 to 4 using the Canadian Cardiovascular Society classification (CCVS).<sup>1</sup> Class I-angina with strenuous exertion, Class II-angina with moderate exertion, Class III-angina with mild exertion, Class IV-angina with any level of physical exertion.

### Introduction

"Angina pectoris" is a surrogate term for myocardial ischemia. The CVVC grading system has served us well, but it is rather broad, based purely on limitations of activity, and does not take into consideration medical or revascularization therapy or other clinical variables such as emotional stress. Efforts should be made to further characterize this markedly heterogeneous group of patients. Can a new grading system for chronic stable angina be devised that will be used clinically, influence management strategies, and be useful for clinical research?

### Decision-making in Chronic Stable Angina Pectoris

SYNTAX, the symptoms of chronic stable angina (ischemia), need to be further stratified in order to be useful for clinical decision-making in a specific patient or for research purposes.<sup>2</sup> Numerous clinical variables need to be taken into consideration. These variables include age, gender, medications taken by the patient, previous PCI or CABG, triggers of symptoms, ECG changes, presence or absence of co-morbid conditions such as hypertension, diabetes, tachycardia, atrial fibrillation, hypoxia, smoking, obesity, valvular heart disease, peripheral vascular disease, renal disease, ventricular function, optimum medical therapy, previous revascularization, limitations of activity based on symptoms or fear of symptoms (anxiety), and desires of the patient for precise diagnosis and subsequent therapy.

In my view, there is no simple way to classify and fully assess the magnitude of myocardial ischemia in patients with chronic angina just as there is no simple way to classify patients with symptoms that suggest acute myocardial ischemia. In the majority of instances, the latter group undergoes several diagnostic studies to assess the ischemic burden, left ventricular function, and the coronary anatomic pathology and morphology. Chronic stable ischemic patients deserve the same strategy.

### Things to Include in Grading of Chronic Angina Patients

Let me illustrate some points by taking you through a sequence of strategies that I use to make clinical decisions in patients with chronic myocardial ischemia.

### Canadian Cardiovascular Society Classification

Like most cardiologists, I use the Canadian Cardiovascular Society system to classify the limitations that the patient has based on symptoms such as pain, dyspnea, palpitations, etc. But in my view, this is not enough.

### Electrocardiogram (ECG)

The ECG is useful to assess chronic or transient changes associated with the symptoms that suggest myocardial ischemia. In patients with stable ischemic heart disease, the twelve lead ECG can be normal in 50% of patients; however, this may be a good sign, since left ventricular function is probably normal. If the ECG is normal during symptoms, it is highly unlikely that symptoms are due to myocardial ischemia.<sup>3</sup>

### Triggers for Chronic Stable Angina

Angina pectoris can be triggered by many things including exercise, emotion, cold, meals, etc. In the asymptomatic cardiac ischemia pilot study (ACIP),<sup>4</sup> a majority of patients with "mild angina" occurring only a few times per week had multiple episodes of silent ischemia on ambulatory ECG. Some of these asymptomatic episodes may have the same triggers as symptomatic episodes. Thus, these patients, although considered "stable" may have stable mild symptoms but not stable myocardial ischemia.

### Stress Testing

In stable ischemic heart disease, exercise testing with electrocardiographic monitoring provides additional information to assess the patient's severity of symptoms as well as ischemia. When the development of symptoms and

ECG changes occur at a low cardiac workload, high grade multivessel coronary stenoses are often present. Prognosis in these patients is worse than in patients whose symptoms and ECG changes occur at a high cardiac workload.

### Myocardium at Risk

A radionuclide study as well as a dobutamine stress echo study can help estimate the area of myocardium at risk. This may not be precise quantitation, but it gives one the idea that a poorly perfused area is either large or not so large, and this finding does influence my management strategies.

### Coronary Angiography

Knowing whether the patient has one, two, or three vessel disease is not very helpful for clinical decision-making or for clinical research purposes. For example, three-vessel disease can be a 70% stenosis of the posterior descending, diagonal, and obtuse marginal vessel. This type of three-vessel disease very likely has different prognostic implications or revascularization strategies than a patient with a 90% proximal stenosis of the LAD, occluded circumflex and Right Coronary artery and collaterals to RCA.

If the score is low, PCI is the appropriate revascularization strategy; whereas if the score is high, coronary bypass graft surgery is more appropriate. During CBA, one also can assess the physiological significance of individual proximal stenoses using fractional flow reserve in addition to left ventricular function, which can be helpful to define ischemic as well as infarction zones and may alter treatment strategies as well as outcomes in patients entered into clinical trials.

In addition, one can identify patients who give a good story for chronic angina who have “normal epicardial coronary arteries” plus a reperfusion abnormality on nuclear stress testing. In these patients, ischemia is related to a microcirculatory problems and can be assessed using coronary flow reserve and requires different management strategies than patients with epicardial stenoses responsible for myocardial ischemia.

### Summary

Patients more or less define the chronicity or the instability of their symptoms of myocardial ischemia. Chronic stable angina (myocardial ischemia) is easily classified into four categories based on activity limitation due to symptoms;

however it is not easily classified into clinical categories that are useful for specific decision-making, e.g. medical therapy, or medical therapy plus revascularization. Some patients are intolerant of one episode of mild myocardial ischemia per day and limit their activity to prevent that one episode, whereas others can tolerate multiple angina episodes and go on about their usual activities. Others can tolerate multiple angina episodes and go on about their usual activities. Using only the CVC classification, the latter patient, who may be at high risk, may get a lower classification than the patient who is intolerant of any angina. Many patients have asymptomatic ischemic episodes in addition to symptomatic ones and can be misclassified as stable angina but may have unstable myocardial ischemia. Approximately, 25% of patients in the ACIP trial had no symptoms, even during positive stress testing.

For patients with chronic stable angina, I think it is appropriate to risk stratify them in a manner similar to the risk stratification schemes for acute coronary syndromes. This requires more than just noting how much the patient is limited by symptoms, since even patients who report mild angina can experience major adverse cardiac events.

One can ask the question, “What is clinically important cardiac ischemia?” The answer to that question is, “I don’t think any myocardial ischemia is good for the individual patient and any amount of ischemia can be associated with a future cardiac event such as myocardial infarction, sustained VT, or sudden cardiac death.”

I am not sure whether a simple grading system that does not take into account the multiple variables listed in this editorial can be useful for clinical decision-making or useful to categorize patients entered into clinical trials.

### References

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